

In the *Bulletin* of the Hungarian Geographical Society, vol. xv. fasc. 7, will be found an interesting paper (abstracted in French) on the struggle for existence among plants in the Hungarian Puszta (steppes).

To the *Bulletin* of the Belgian Geographical Society, No. 4, 1887, M. Louis Navez contributes an instructive paper on the influence of the various geological formations in Belgium, especially upon the people. M. Navez points out that Belgium is specially favourable for such an investigation. In France and Germany the great differences of altitude and latitude, and the diversity of climate, determine phenomena often difficult to distinguish from those which are really due to geology, and are therefore causes of error. In Belgium the differences of altitude, of latitude, and of climate are not of so much importance. The influence of the character of the soil is almost always preponderant, and is easily distinguished. One instance may be given. The great quantity of lime which the Cretaceous soil of the Geer valley contains gives to the straw of the cereals a special suppleness, strength, and whiteness. From this straw are manufactured plaits which have a large sale, and in Paris are ranked next to the straw of Italy for ladies' bonnets. This manufacture is worth from four to five million francs yearly. On the other hand, the absence of calcareous salts in the ground traversed by the feeders of the Lys, render that river eminently suited for the cleansing of flax; hence the fame of the cloths of Flanders. M. Navez believes that the facts he brings together prove that the geological construction of the ground is one of the factors that limit the free will of man and have an active influence on communities.

IN Dr. Oscar Baumann's paper on Fernando Po, in No. ix. of *Petermann's Mittheilungen*, the author states that the volcanic group of which the island is a member, forms a line running south-west from the Cameroons, and may be regarded as the result of an eruptive fissure, which on the one side extends from the Cameroons to the island of Annobon, and on the other appears to find in the Rumbi Mountains a continuation into the heart of Africa. The northern half of the island is covered almost entirely by the huge volcanic peak of O-Wassa (Clarence Peak). After careful estimation he gives the summit a height of 9350 feet. The volcano may be regarded as extinct, the fire and clouds of smoke seen at times on the summit being easily explained by the annual burning of the grass. The crater on the top of the mountain is 515 feet in depth, and is inclosed by gray disintegrated walls of basalt. On the thickly wooded and almost impassable slopes are many subsidiary craters. The basaltic rock of the east coast is being gradually crumbled away by the sea, while along the west coast the land is gaining on the sea. The physical geography of the southern half of the island is determined by the mountain range of the "Cordillera of Fernando Po," which in two chains connected by a pass runs practically east and west. These chains culminate in several summits, which have a volcanic character only on account of their basaltic composition. In the south of the island, and apparently quite independent of the Cordillera, there rises a lofty volcanic mass. On the top of one cone-shaped peak, precipitous on all sides, there extends a flat basin surrounded by a circle of hills. This the author supposes to be the remains of a large crater.

M. A. J. WAUTERS writes a long article in the new number of the *Mouvement Géographique* to prove that Lake Muta-Nzigé, the somewhat problematical lake to the south of Albert Nyanza, belongs to the Congo system, and not to that of the Nile. The altitudes and other data which M. Wauters has on which to base his conjecture are of the scantiest, and extremely doubtful. It seems to us that such conjectural arm-chair geography is a useless waste of time and space. The question of the relation between the Muta-Nzigé and the Albert Nyanza can only be solved by actual exploration. By this time no doubt it has been solved either by Emin Pasha or Stanley, and M. Wauters might therefore put the valuable space of his small journal to a much more profitable use.

METEOROLOGICAL NOTES.

THE Hydrographer to the Admiralty has issued a circular stating that the United States Government has given notice that from September 1, 1887, the following storm signals (consisting of day signals of two kinds, also night signals), would be shown

on the shores of the Atlantic Ocean, Gulf of Mexico, and Great Lakes, as storm conditions may demand, taking into consideration the fact that westerly winds of high velocity with clearing weather are less dangerous than those from easterly quarters with freezing weather: (1) cautionary signal, a *yellow flag with white centre*, will indicate that the storm is expected to be of but that well-found and seaworthy vessels can meet them without great danger; (2) storm signal (now in use), a *red flag with black centre*, will indicate that the storm is expected to be of more marked violence. In order to afford as exact information as possible regarding the relative positions of the storm and the winds expected, two pendants will be displayed: a *red pendant* will indicate easterly winds, from north-east to south inclusive, and that the storm centre is approaching; a *white pendant* will indicate westerly winds, from north to south-west inclusive, and that the storm centre has passed. Whilst it is intended that the pendant shall indicate positively only whether the winds will be easterly or westerly, yet in order to give still more definite information, the *red or easterly pendant* will be hoisted above the cautionary or storm signal, for winds from the north-east quadrant, and below for winds from the south-east quadrant. Also, the *white or westerly pendant* will be hoisted above the cautionary or storm signal for winds from the north-west quadrant, and below for winds from the south-west quadrant. Because of the difficulty of varying night signals, they will not distinctly show the force, but indicate the direction of the wind only; a *red light* for easterly winds, and a *red and white light* for westerly winds.

THE Pilot Chart of the North Atlantic Ocean, issued by the Hydrographic Office at Washington for the month of September, includes a valuable article on the law of storms, considered with special reference to the approaching season of West Indian hurricanes. The article is accompanied by two diagrams illustrating (1) the circulation of the wind in a tropical cyclone in the northern hemisphere, showing clearly how the wind is drawn in towards the centre of low barometer, and its direction at any point; and (2) a diagram for practical use in finding a ship's position relatively to the centre of the hurricane, by means of the direction of the wind and fall of the barometer. The circles in this diagram are normal isobars, and represent the rate at which the barometer falls as the centre of the storm is approached, so far as our latest knowledge of cyclones can be safely used as a general guide. Full directions are given for the practical use of these diagrams. The Pilot Charts contain frequent extracts from ships' logs, as to the great value of the use of oil in heavy seas, and the Hydrographic Office considers that the testimony is so conclusive that its use is now recognized by every commercial nation. The Charts contain information about winds, currents, fog, and the position of dangerous derelicts, and their speedy dissemination must prove to be of great utility to the maritime community generally.

THE *Annalen der Hydrographie und maritimen Meteorologie* for August contains a graphical representation of the distribution of rainfall in the Atlantic and Indian Oceans, compiled by Dr. W. Köppen from materials at the disposal of the Deutsche Seewarte and all other available sources. The latitude is shown in the vertical, and the months in the horizontal direction; each point of the area of the diagram therefore indicates a definite time of the year, and a definite distance from the equator, and the curves show the equal percentages of days of rainfall. The diagrams are explained in the text, and show the relatively large rainfall frequency in the higher latitudes of the North Atlantic in all seasons, but especially during winter; further southwards, towards the region of the trade-winds, all months become drier, but north of the tropics rain falls on an average once in every 5-10 days. In the South Atlantic the conditions are more complicated. From 0°-5° S. autumn rains are prevalent, and from 5°-14° S. the winter rainfall maximum is prominent. In the Indian Ocean the equatorial rain-belt is considerably widened, especially on the southern side. From 2° N. to 12° S. the rainfall frequency does not fall below 50 per cent. in any month, and from June to October it exceeds 70 per cent. Between 10° and 12° S., and also from 25°-30° S. the spring-time is driest; while from 33° S. the rainfall increases rapidly in winter and spring. South of 40° S. it rains eight days out of ten during July and August.

Symons's Monthly Meteorological Magazine for September contains interesting articles on the deficiency of rainfall this year and on the definition of drought. From a comparison

of the rainfall at 27 stations from January 1 to August 31, 1870-79, and for the same period in 1887, and expressing the difference of 1887 from the average as a percentage, it appears that the mean percentage this year has been : for England 59.8, for Wales 60.0, for Scotland 68.5, and for Ireland 60.3. Out of 11 stations in England the drought is unprecedented at 6, in Scotland at 6 stations out of 8, and in Ireland at 5 stations out of 6. Scotland has suffered least, and in parts of England the deficiency has reached the extreme limit that may be expected. There appears to be no good definition of a drought. In 1880 Mr. Symons adopted a classification for his numerous observers, which has generally been used up to the present time, viz. (1) absolute drought, being a period of 14 or more consecutive days without rain; (2) partial drought, being a period of 28 or more consecutive days in which the total rainfall did not exceed 0.25 inch. But engineers speak of droughts varying from 140 even to 240 days; these can bear no comparison with the above definitions, and Mr. Symons suggests a third term, viz. long drought, being a period of not less than 60 days with a total rainfall of not less than 2 inches. Opinions are wanted as to how the records of rainfall observers may be best utilized in the form most useful to engineers.

MR. J. W. OLIVER has contributed an article to *Longman's Magazine* for October on the moon and the weather, in which he discusses some of the most important of the popular predictions in which the moon is concerned. He deals (1) with the lunar notions that are utterly absurd, and (2) with those that are explicable by the aid of physical principles. The conclusion at which he arrives is that there is more nonsense than sense in lunar predictions, but that it is unfair to consider the whole subject as unworthy of serious treatment. For instance, atmospheric tides due to the moon's attraction must exist, although generally obliterated by disturbances due to other causes. The author apparently favours Sir John Herschel's statement of the tendency of the full moon to clear the sky, and in support of that theory he quotes the experiments of Melloni and others, showing that moonlight contains a minute proportion of dark heat rays, the effect of which may in a certain measure cause the dispersion of the clouds. The lunar halo is also referred to as an old sign of bad weather. Of 61 halos observed near London 34 were followed by rain within 24 hours and 19 within four days. In the *Mittheilungen aus dem Gebiete des Seewesens* for June, published by the Hydrographic Office of Pola, Capt. C. von Bermann has an article upon the same subject. He deals chiefly with Herr Falb's attempt to reinstate the moon's influence in his work "Das Wetter und der Mond." The result arrived at is that, although the moon has an influence on the weather, it is too infinitesimal, compared with other influences, to be appreciable.

THE Annual Report of the Meteorological Observer for Tasmania for the year 1886 gives the results of observations taken at 11 stations and rainfall reports from 37 stations.

THE SIXTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY IN VIENNA.

(FROM OUR OWN CORRESPONDENT).

THE most important questions dealt with at the Vienna Congress were those relating to preventive medicine, a branch of medical science which originated with Edward Jenner's discovery of immunity from small-pox by means of vaccination. The high value of vaccination and re-vaccination was clearly shown in the Demographic Section of the Congress by statistical tables exhibited by T. Körösi, the Director of the Statistical Office in Buda-Pesth. According to these tables the mortality of the not-vaccinated patients treated in nineteen Hungarian small-pox hospitals was 800 per cent. larger than that of the vaccinated patients, while the receptivity for getting the disease was three and a half times larger in the not-vaccinated as compared with the vaccinated people. In the Fourth Section the question of vaccination was also submitted for discussion by a lecture delivered by a Turkish delegate, Dr. Violi, and a resolution recommending to all Governments the introduction of compulsory vaccination was unanimously adopted.

Thanks to the valuable discoveries of Pasteur, the method of protecting the life and health of men as well as animals by vaccination has been worked out more extensively, and is now applied

with the best success against various desolating and destructive diseases. The beneficial effects of the various methods of preventive inoculations, the amount of saving of human and animal life brought about by their use, will easily be perceived by a sketch of the discussions which were held at the last meetings of the Third Section of the Congress.

A special sub-section was formed where the special results obtained by the preventive inoculations in splenic fever, and erysipelas of the pig, were reported and discussed upon. Dr. Lydtin, of Carlsruhe, gave an interesting account of the development of the measures against the different plagues, alluding also to the defects of repressive measures, by which cattle-trade and cattle-breeding are so severely affected. While two centuries ago the first trials made of providing immunity against sheep-pox and other plagues were based on purely empirical views, the recent bacteriological discoveries have led to the scientific method of vaccination with an attenuated virus. Dr. Chamberland, Pasteur's assistant, reported on the results obtained by the preventive inoculations against (charbon) splenic fever in France, Hungary, Italy, and Russia. In the year 1886, 367,208 of sheep and 47,229 of cattle had been subjected to anti-charbon inoculations. Chamberland's statements were considerably supported by the results obtained with Pasteur's methods in Switzerland and at Pakisch, Prussia, which were communicated by Dr. Custer of Zurich and Dr. Lydtin (Carlsruhe). On the other side, the practical value of the preventive inoculations in splenic fever was severely contested by Dr. Löffler, of the Berlin School. An animated discussion on this subject went on for three hours and a half.

By the majority of the speakers it was pointed out that no loss by death—or only a small percentage of such loss—was caused by the inoculation itself in cattle, and that the number of cases of natural splenic fever decreased very much after the preventive inoculations; but in sheep the vaccinations against charbon were not equally favourable. As to the duration of the immunity acquired by the vaccination no positive statements could be made.

Then the usefulness of preventive inoculation against charbon symptomatique (Rauschbrand) was dealt with, and was acknowledged by all the speakers. In the course of the discussion on the preventive inoculations against erysipelas in the pig—a discussion in which Drs. Lydtin, Chamberland, and Prof. Czokor of Vienna, took part—it was stated that by the inoculations the animals get immunity against the disease, but that further improvements of the method are wanted, as there is now a considerable loss of inoculated animals by the vaccination itself, and sometimes the spreading of disease in healthy animals. In conclusion it was resolved on a vote that the experiments on preventive inoculations against splenic fever, charbon symptomatique, "erysipelas of the pig," and the other epizootics ought to be continued under the control of and assisted by Governments.

The battle-ground of the Congress from a scientific point of view was the discussion on the preventive inoculations against rabies. Dr. Chamberland gave a *résumé* of the development of Pasteur's method, and the results obtained by this treatment in France. 2682 persons were treated and the average mortality was only 7.5 per cent.; while the mortality of persons bitten by rabid animals if not inoculated varied between 5 and 30 per cent., according to the statements made by different authors. In answering the objections made by some recent writers who had expressed the opinion that the death of patients from hydrophobia was caused by the inoculations themselves, he maintained that it was proved by experiments made with the spinal cord of those persons that the death was caused by the bite of the rabid animal, not by the inoculations. If animals were inoculated with brain emulsions of those persons they became rabid, but they died on the fourteenth or fifteenth day after inoculation, while they would have succumbed on the seventh day if the death of the persons had been caused by the inoculated virus.

Dr. Bordoni-Uffreduzzi of Turin, in making experiments on dogs and animals, found that various parts of the brain of rabid animals show different degrees of virulence. The pancreatic gland is nearly as virulent as the brain, while the liver and spleen seem to act much less strongly as media of the virus. He had also treated 119 persons bitten by rabid dogs; three of them died.

Dr. Emmerich Ullmann, assistant of Prof. Albert of Vienna, has performed preventive inoculations in 122 persons. Only persons who could prove by documents the rabid condition of